

WHAT IS CLAIMED IS:

- 1                   1.       An isolated, substantially pure, or recombinant protein preparation of  
2 a human telomerase reverse transcriptase (hTERT) protein, or a variant thereof, or a fragment  
3 thereof.
- 1                   2.       An isolated, synthetic, substantially pure, or recombinant  
2 polynucleotide that is at least ten nucleotides to 3kb in length and comprises a contiguous  
3 sequence of at least ten nucleotides that is identical or exactly complementary to a contiguous  
4 sequence encoding a recombinant protein of claim 1.
- 1                   3.       The polynucleotide of claim 2 that encodes an hTERT protein or  
2 fragment.
- 1                   4.       A method of identifying a compound that modulates hTERT activity,  
2 said method comprising the steps of contacting an hTERT protein of claim 1 with said  
3 compound and measuring a change in a property or activity of said hTERT, wherein a  
4 statistically significant change in said property or activity identifies said compound as a  
5 modulator of hTERT activity.
- 1                   5.       The method of claim 4 wherein the compound is an inhibitor of hTERT  
2 activity.
- 1                   6.       A method of preparing recombinant telomerase, said method  
2 comprising contacting a recombinant hTERT protein of claim 1 with a telomerase RNA  
3 component under conditions such that said recombinant protein and said telomerase RNA  
4 component associate to form a telomerase enzyme capable of catalyzing the addition of  
5 nucleotides to a telomerase substrate.
- 1                   7.       The method of claim 6, wherein the hTERT protein has a sequence of  
2 Figure 17.

1                   8.       The method of claim 7, wherein the hTERT protein is produced in an *in*  
2 *vitro* expression system.

1                   9.       The method of claim 6, wherein a said hTERT protein is substantially  
2 purified before said contacting.

1                   10.      A method for increasing the proliferative capacity of a vertebrate cell  
2 by introducing a recombinant hTERT polynucleotide of claim 3 into the cell, and wherein said  
3 sequence is operably linked to a promoter.

1                   11.      A method of detecting the presence of at least one telomerase positive  
2 human cell in a biological sample comprising human cells, said method comprising the steps:  
3                   a)       measuring the amount of an hTERT gene product in said  
4 sample,  
5                   b)       comparing the amount measured with a control correlating  
6 to a sample lacking telomerase positive cells,  
7                   wherein the presence of a higher level of the hTERT gene product in said  
8 sample as compared to said control is correlated with the presence of telomerase positive cells  
9 in the biological sample.

1                   12.      The method of claim 11, wherein said telomerase positive cells are  
2 cancer cells.

1                   13.      The method of claim 11, wherein the amount of an hTERT gene  
2 product is measured using an antibody.

1                   14.      The method of claim 11, wherein the amount of an hTERT gene  
2 product is measured using a nucleotide probe.

1                   15.      The method of claim 11, wherein said detecting involves diagnosing a  
2 telomerase-related condition in a patient, and said method further comprises the steps of:  
3                   a)       obtaining a cell or tissue sample from the patient;  
4                   b)       measuring the amount of an hTERT gene product in the cell  
5 or tissue; and,

6 c) comparing the amount of hTERT gene product in the cell or  
7 tissue with the amount in a healthy cell or tissue of the same type;  
8 wherein a different amount of hTERT gene product in the sample from  
9 the patient and the healthy cell or tissue is diagnostic of a telomerase-related condition.

1 16. The method of claim 15 wherein the amount is higher in said sample  
2 than in said healthy cell or tissue and said telomerase-related condition is cancer.

1 17. A method for treatment of a condition associated with an elevated  
2 level of telomerase activity within a cell, comprising introducing into said cell a  
3 therapeutically effective amount of an inhibitor of said telomerase activity, wherein said  
4 inhibitor is an hTERT polypeptide, an antibody that binds hTERT, or an hTERT polynucleotide.

1 18. The method of claim 17, wherein the inhibitor is an oligonucleotide  
2 comprising the sequence of Figure 17 or a subsequence or variant thereof.

1 19. The method of claim 18, wherein the oligonucleotide comprises  
2 nonstandard or derivatized bases or linkages between bases.

1 20. The method of claim 17, wherein the inhibitor is a polynucleotide that inhibits binding  
2 of endogenous hTERT to hTR.